

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 19

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte EDMUND S. SCHINDLER, LEV TSIRULNIKOV,  
JOHN GUARCO, JON MOORE and MICHAEL GAMBURG

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Appeal No. 2004-0539  
Application No. 09/921,254

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ON BRIEF

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Before COHEN, FRANKFORT, and MCQUADE, Administrative Patent Judges.

FRANKFORT, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 1 through 21, all of the claims pending in this application.

As noted on page 1 of the specification, appellants' invention relates to industrial burners which burn fuel gas and/or oil and are specifically constructed and engineered for emitting low levels of nitrogen oxide (NO<sub>x</sub>) and carbon monoxide

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(CO) air pollution. In addition, the invention relates to the methodology for operating such burners, whereby substantial reductions of CO and NO<sub>x</sub> emissions are achieved relative to existing burners. Independent claims 1 and 6 more specifically set forth the burner structure, while independent claims 12 and 17 set forth the method for operating the burners. A copy of claims 1, 6, 12 and 17 may be found in the Appendix to appellants' brief (Paper No. 12).

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Brazier et al. (Brazier)	4,708,638	Nov. 24, 1987
Bury et al. (Bury)	5,634,785	Jun. 3, 1997

Claims 1 through 21 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Brazier in view of Bury.

Rather than reiterate the examiner's full statement of the above-noted obviousness rejection and the conflicting viewpoints advanced by the examiner and appellants regarding the rejection, we make reference to the examiner's answer (Paper No. 13, mailed June 13, 2003) for the examiner's reasoning in support of the rejection, and to appellants' brief (Paper No. 12, filed March

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26, 2003) and reply brief (Paper No. 14, filed August 11, 2003)  
for the arguments thereagainst.

### OPINION

In reaching our decision in this appeal, we have given careful consideration to appellants' specification and claims, to the applied prior art references, and to the respective positions articulated by appellants and the examiner. As a consequence of our review, we have made the determination which follows.

Like the examiner, we note that Brazier discloses a venturi tube equipped burner which may be fluid fuel fired, gas fired, or combination oil and gas fired (col. 2, lines 3-7), and a method of operating such a burner for producing reduced emissions of nitrogen oxides (NOX, same as NO<sub>x</sub>). The burner of Brazier includes a venturi tube (21), a fuel pipe (13) and nozzle (26) located centrally of the venturi tube, and a swirler (27) positioned so that at least a primary portion of a flow of air passes therethrough. A duct system (25, 25a, 25b, 25c) is associated with the burner and arranged and adapted to recirculate a stream of flue gas from a location in the

combustion chamber adjacent the combustion zone and into a flue gas inlet portion of the venturi tube at the throat thereof, whereby the stream of flue gas is induced into a low pressure area at the throat of the venturi and intermixed in the low pressure area with a primary flow of combustion air (col. 3, lines 4-21). Brazier notes that the mixing of the inert flue gas with combustion air (34) before fuel is introduced and combusted (at 26) retards the primary flame combustion while still maintaining control and stability of the flame, thereby producing a lower flame temperature and resulting in a reduction in NOX production (col. 3, lines 22-33).

What the burner of Brazier lacks relative to appellants claimed subject matter is any teaching of a fuel gas injector, like that seen at (56/60) of appellants drawings, which extends through the combustion chamber wall at a location adjacent the combustion zone and positioned to direct a flow of fuel gas into the combustion chamber at a location beyond the inner edge of the entrance to the combustion chamber.

To supply this deficiency in Brazier, the examiner looks to the burner of Bury, which burner is characterized as having very

small nitrogen oxide (NOX) emissions. In column 1, lines 20-40, Bury notes two different known ways for limiting the maximum flame temperature of a burner and thereby reducing the content of nitrogen oxides in the flue gases. In the first of these approaches, Bury indicates that it is known to reduce the content of free oxygen in the gaseous fuel flame to avoid too strong a combination of the oxygen with the nitrogen in the combustion air and to limit the maximum flame temperature by recycling a portion of the inert flue gases generated in the combustion chamber to mix with the combustion air prior to its entry into the combustion chamber. In particular, it is noted that it is known to realize this recycling by means of gaseous fuel ejection systems associated with venturi-type intake conduits for the flue gases, which utilize the low pressure created by the ejection of the fuel gas. The second known approach noted in Bury for reducing the maximum flame temperature is by staggering the combustion, that is, instead of presenting the totality of the combustion fuel and the combusting agent in a single zone, the introduction takes place in various stages.

In column 1, lines 41-44, Bury indicates that an object of the invention therein is "to provide a gas burner which combines

these two processes of recycling the flue gasses, on the one hand, and staggering the supply of fuel gas and the combustion air, on the other hand." At column 3, lines 39-43, Bury further indicates that by combining the two known and afore-mentioned means for reducing the production of nitrogen oxides, a good combustion mixture is obtained without creating a zone of turbulence, thereby resulting in the content of nitrogen oxides in the flue gases being reduced by at least 70%. Thus, Bury discloses a burner (Figs. 1-2) for producing very small NOX emissions by simultaneously utilizing both recycling of flue gases and staggering of the supply of fuel gas and the combustion air, wherein the burner includes, *inter alia*, and in addition to a flue gas recycling means, a set of fuel gas injectors (10) extending through the combustion chamber wall (1) at a location disposed outside combustion air supply passage (2) and peripherally distributed thereabout, and located adjacent the combustion zone and radially beyond the inner edge of the central entrance to the combustion chamber.

In the examiner's view, based on the collective teachings of Brazier and Bury, it would have been obvious to one of ordinary skill in the art at the time appellants' invention was made to

modify the burner of Brazier to incorporate a fuel gas injector arrangement like that at (10) of Bury for the desirable purpose of providing combustion staggering (Bury, col. 5, lines 15-24), which allows the maximum temperature of the gaseous fuel flame to be limited (Bury, col. 1, lines 32-40). In that regard, the examiner notes that reduction of flame temperature is well known in the art to desirably aid in reducing the production of NOX (Brazier, col. 1, lines 6-10). Implicit in the examiner's rejection is that the method of operating a burner for reduced CO and NOX emissions as set forth in claims 12-21 on appeal would obviously and inherently be performed when operating the burner of Brazier as modified by Bury.

We concur in the examiner's assessment of obviousness of the claimed subject matter under 35 U.S.C. § 103(a) based on the combined teachings of Brazier and Bury. Like the examiner (answer, pages 4-5), we do not see that the mere fact that Bury is not a venturi type burner, like that seen in Brazier, would have deterred one of ordinary skill in the art at the time of appellants' invention from making the combination as posited by the examiner, especially since Bury (col. 1, lines 20-32) recognizes that a venturi-type arrangement for the recycling of

flue gasses to be mixed with primary combustion air to reduce the content of free oxygen in the gaseous fuel flame and thereby limit the maximum temperature of the flame (e.g., as shown in Brazier) is known in the art, and then specifically teaches that a gas burner that combines both the processes of flue gas recycling and staggering the supply of the fuel gas and combustion air advantageously provides flue gasses having very low emissions of NOX, i.e., at least a 70% reduction in the content of NOX in the flue gases (col. 3, lines 39-43). As for appellants' contention (brief, page 6) that Bury relates solely to gas burners while Brazier relates principally to liquid fuel burners and that this fact further isolates the disclosures of Bury and Brazier from one another and emphasizes the lack of any suggestion for their combination, we agree with the examiner that the disclosure of Brazier at column 2, lines 3-7, belies any such distinction, since it expressly indicates that the venturi type burner arrangement of Brazier "can be applied also to gas fired burners and (combination) oil and gas fired burners."

Regarding appellants' comments in the brief and reply brief concerning fuel lances or nozzles (19) of Bury, we first note that it is the fuel supply pipes (10) arranged outside the



combustion air supply passage (2) of Bury which are relied upon by the examiner, not fuel lances (7) and nozzles (19) located within the air supply passage, and further observe that the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference, nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art at the time of appellants' invention. See, In re Keller, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981). In the present case, given the common goal in both Brazier and Bury of reducing NOX in the flue gasses, and the specific statement in Bury regarding combining the two processes of flue gas recycling and staggering of the supply of fuel gas and combustion air to achieve very low emissions of NOX, we concur in the examiner's position that the combined teachings of the applied references would have reasonably suggested to one of ordinary skill in the art at the time of appellants' invention adding a fuel gas injector arrangement like that at (10) of Bury to the burner of Brazier so as to attain very low NOX emissions resulting from using both flue gas recycling and fuel gas/combustion air staggering

together in a single burner. In reaching this conclusion, we have presumed skill on the part of the artisan, rather than the converse. See In re Sovish, 769 F.2d 738, 743, 226 USPQ 771, 774 (Fed. Cir 1985).

In further response to appellants' arguments in the brief and reply brief concerning combinability of the applied patents, we also observe that where the issue is one of obviousness under 35 U.S.C. § 103, the proper inquiry should not be limited to the specific structure shown by a reference, but should be into the concepts fairly contained therein, with the overriding question to be determined being whether those concepts would have suggested to one skilled in the art the modification called for by the claims. See In re Bascom, 230 F.2d 612, 614, 109 USPQ 98, 100 (CCPA 1956). Furthermore, under 35 U.S.C. § 103, a reference must be considered not only for what it expressly teaches, but also for what it fairly suggests (In re Burckel, 592 F.2d 1175, 1179, 201 USPQ 67, 70 (CCPA 1979); In re Lamberti, 545 F.2d 745, 750, 192 USPQ 278, 280 (CCPA 1976)), as well as the reasonable inferences which the artisan would logically draw from the reference. See In re Shepard, 319 F.2d 194, 197, 138 USPQ 148, 150 (CCPA 1963).

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In light of the foregoing, the examiner's rejection of claims 1 through 21 under 35 U.S.C. § 103(a) will be sustained. Notwithstanding appellants' grouping of claims set forth on page 4 of the brief, we note that appellants have failed to separately argue the patentability of claims 6 through 11 and 17 through 21 apart from claims 1 through 5 and 12 through 16 in any meaningful manner, essentially urging in both instances that it would not have been obvious to modify the Brazier burner by adding to it a fuel lance as disclosed by Bury. Thus, we have concluded that claims 2 through 21 will fall with representative independent claim 1. See, In re Wood, 582 F.2d 638, 642, 199 USPQ 137, 140 (CCPA 1978).

The decision of the examiner rejecting claims 1 through 21 under 35 U.S.C. § 103(a) is affirmed.

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No time period for taking any subsequent action in  
connection with this appeal may be extended under 37 CFR  
§ 1.136(a).

AFFIRMED

IRWIN CHARLES COHEN	)	
Administrative Patent Judge	)	
	)	
	)	
	)	
	)	BOARD OF PATENT
CHARLES E. FRANKFORT	)	APPEALS
Administrative Patent Judge	)	AND
	)	INTERFERENCES
	)	
	)	
	)	
JOHN P. MCQUADE	)	
Administrative Patent Judge	)	

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